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fungus mycelium is necessary to tuber-formation in orchids, though he states that infection occurs first in the root of the orchid. * In view of the above facts, *Hexalectris aphyllus* may be regarded as a true saprophyte, deriving its nourishment from the disintegrating organic matter of the soil, by the direct absorption of its epidermal cells, with no roots, hairs, or other organs differentiated for absorption.

The herbarium of the New York Botanical Garden contains specimens of *Hexalectris aphyllus* collected as follows: ALABAMA, Auburn, Lee Co., *L. M. Underwood*, 1896; *S. M. Tracy*, 1897. ARKANSAS, Little Rock, *Dr. H. E. Hasse*, 1885. FLORIDA, Jacksonville, *H. D. Keeler*, 1870-76; Lake Co., *Geo. V. Nash*, 1895. GEORGIA, Alcovy Mt., Oconee Co., *J. K. Small*, 1893; Kenesaw Mt., *R. M. Harper*, 1900; Mt. Rachel, Dalton, *Percy Wilson*, 1900. KENTUCKY, Lexington, *Dr. C. W. Short*, 1835. MISSOURI, Kennett, *B. F. Bush*, 1895; St. Louis, *H. Eggert*, 1891. NORTH CAROLINA, Swain Co., *H. C. Beardslee & C. A. Kofoid*, 1891. SOUTH CAROLINA, Paris Mt., *J. K. Small*, 1896. TENNESSEE, Nashville, *Dr. A. Gatteringer*, 1898; Wolf Creek Station, *Thos. H. Kearney*, 1897. MEXICO, San Luis Potosi, *Dr. J. G. Schaffner*, 1879.

EXPLANATION OF FIGURES

Hexalectris aphyllus. 1, cells from epidermis with overlying fungus hyphae; 2, epidermal cells (*e*) and raphide-containing cells (*r*); 3, cells from epidermis showing reticulations (*re*); 4, rhizome; 5, rhizome with branches and scape (*s*).

LABORATORY OF THE NEW YORK BOTANICAL GARDEN.

SOME PLANTS OF SOUTHEASTERN VIRGINIA AND CENTRAL NORTH CAROLINA

BY ROLAND M. HARPER

On my way to Georgia in June of this year I made in passing through Virginia and North Carolina the following observations, which will add something to our knowledge of the distribution of several interesting plants.

* Bernard, *Rév. Gen. Bot.* 14: 17. 1902.

My itinerary through these two states was as follows: On the 10th I spent most of the day in the vicinity of Norfolk and Portsmouth, in a region which has often been visited by well-known botanists, and has had its phytogeographical features described in several published papers, particularly in Mr. Kearney's admirable "Report on a Botanical Survey of the Dismal Swamp Region." *

On the 11th I went from Portsmouth westward sixty miles through the coastal plain of Virginia and southwestward across North Carolina, by the Seaboard Air Line, entering the latter state near Margarettsville. About twenty miles farther west, near Weldon, on the Roanoke River, the railroad crosses the fall-line and enters the Piedmont region. Thence continuing southwestward by way of Raleigh, the coastal plain is entered again near Sanford, in Moore County.

From there to Hamlet, in Richmond County, near the South Carolina line, where darkness overtook me, I passed through an extensive sand-hill region which is doubtless a continuation of the fall-line sand-hills of Georgia and South Carolina. These North Carolina sand-hills were particularly interesting to me because I had never seen them mentioned in botanical or geological literature, and they probably have not been explored as much as they deserve, though they are on one of the principal routes of travel between the North and South, and are visited by many tourists during the winter season.

The inland edge of the Columbia formation (of which these and other sand-hills in the southeastern United States are composed) is represented on the best map of this formation I have seen as being about forty miles nearer the coast, a remarkable discrepancy.

For the last fifteen miles north of Hamlet scarcely any signs of civilization were seen. This is a characteristic feature of many sand-hill regions, where the sand is so deep that the land is of little value for agricultural purposes.

Among the plants observed on this trip the following deserve special mention.

* Contr. U. S. Nat. Herb. 5 : 321-550. *pl.* 65-77. *f.* 51-90. 1901.

PINUS PALUSTRIS Mill.

Seems very rare in Virginia, but commoner in the coastal plain of North Carolina, especially on the sand-hills. Where none of this pine is in sight from the railroad its occurrence in the vicinity may often be inferred from the presence of wood-burning locomotives on the numerous branch roads, even several miles west of the fall-line. The two winter resorts in Moore County, Pinehurst and Southern Pines, of course take their names from this species. Some turpentine has been extracted from it near Pinebluff, in the same county.

PINUS SEROTINA Michx.

On the morning of the 10th I found several small trees of this species, fruiting abundantly, in low grounds in Norfolk County, Virginia, about three miles southwest of Portsmouth. The characteristic long persistence of the cones was well shown by the fact that some of them remained attached to limbs which had grown to a diameter of an inch and a half. To make sure that there was no mistake about the species (which was not previously known to occur north of North Carolina, and is not mentioned in floras of the Northern States, or even in Mr. Kearney's Dismal Swamp report), fresh specimens were immediately sent back to Washington for verification.

Other plants occurring at the same place were *Pteridium aquilinum*, *Scleria triglomerata*, *Aletris farinosa*, *Liquidambar styraciflua*, *Polygala lutea*, *Rhus copallina*, *Acer rubrum*, *Gaylussacia frondosa* and *Eupatorium ovatum*.

The next day I saw a good deal of this pine from the train between Portsmouth and Suffolk, where it often forms colonies almost unmixed with other trees. Beyond Suffolk I did not see it again until I reached the sand-hills of North Carolina, where there is a good deal of it in the vicinity of Keyser and elsewhere.

CHAMAECYPARIS THYOIDES (L.) B.S.P.

Abundant for a few miles in Moore County, N. C., between Aberdeen and Keyser, in non-alluvial swamps among the sand-hills. I have not met with this species anywhere else south of New England.

TAXODIUM DISTICHUM (L.) Richard

Seen in several river-swamps in and adjacent to Southampton County, Va., especially along the Blackwater, Chowan and Meherrin rivers. Almost always associated, here as in Georgia, with *Nyssa uniflora*, which has nearly the same range.

TAXODIUM IMBRICARIUM (Nutt.) Harper

My hopes of seeing this species in Virginia were not realized, but I noticed some fine specimens of it in a swamp at the southern edge of Moore County, N. C., near Keyser, about 125 miles from the coast.

SCIRPUS ATROVIRENS Muhl.

In ditches and meadows near Cary, Wake County, N. C., in the Piedmont region.

HICORIA AQUATICA (Michx. f.) Britton

Along the Meherrin River on the line between Southampton County, Va., and Northampton County, N. C. Stations for this species so far north are probably rare enough to be worth mentioning.

QUERCUS CATESBAEI Michx.

Common on the driest sand-hills of North Carolina, from Walnut Grove southward. In Richmond County this with *Pinus palustris* forms almost the only arborescent vegetation for miles. Probably not reported so far inland in North Carolina before.

QUERCUS MINOR MARGARETTA Ashe

With the preceding but less common. Noted especially between Vass and Niagara, Moore County, N. C. Very little has been published concerning the exact distribution of this oak, so the above record may be of some service.

SARRACENIA FLAVA L.

This species is so conspicuous and easily distinguished that I rarely fail to make a note of it wherever I see it. There is a little of it between Margarettsville and Seaboard in the coastal plain of North Carolina, a few miles south of the Virginia line, also near

Littleton, west of the fall-line. In the sand-hill region it is very common, being rarely out of sight for about 30 miles, from Sanford to Keyser. (In Georgia I have not seen it within 50 miles of the fall-line.)

ACANTHOSPERMUM AUSTRALE (L.) Kuntze

First seen on this trip at Manly, Moore County, N. C., which is about five miles farther north than Aberdeen, where I observed it three years before.* This weed is doubtless steadily pushing northward. It is now very abundant around Aberdeen.

PARTHENIUM INTEGRIFOLIUM L.

Seen at several points west of the fall-line in Warren and Wake counties, N. C., in dry soil.

LENIE, GEORGIA, July 10, 1903.

A KEY TO THE NORTH AMERICAN SPECIES OF PLUTEOLUS

BY F. S. EARLE

The genus *Pluteolus* includes those gill-fungi having a smooth, viscid, usually expanded pileus, free gills, yellowish-brown spores, and slender usually hollow stems. Some of the species have been confused with *Galera*, from which they may be distinguished by the expanded viscid pileus and free gills. Others have been referred to *Bolbitis* from which they differ in the persistent gills that do not deliquesce with age. The following ten species and varieties have been reported from North America. They usually grow either on manured ground or on old rotten wood.

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|---|--------------------------------------|
| 1. Pileus pure white when young, sordid with age. | <i>P. sordidus</i> (Lloyd) Peck |
| Pileus pinkish-gray, often cespitose. | <i>P. coprophilus</i> Peck |
| Pileus yellow. | <i>P. luteus</i> Peck |
| Pileus brown or olivaceous. | 2. |
| Pileus violaceous, rugose-reticulate. | <i>P. reticulatus</i> (Pers.) Gillet |
| 2. Stipe fibrillose. | 3. |
| Stipe glabrous or pruinose. | 4. |

* See Bull. Torrey Club, 28: 454. 1901.